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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/729,804

**Applicant(s)**

WANG ET AL.

**Examiner**

Glenford Madamba

**Art Unit**

2451

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This action is in response to remarks filed by Applicant's representative on January 6, 2009.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 7 and 8 recites "...at least one ingress rate controller claimed in claim 1". However, claim 1 is directed to "an egress rate controller monitoring.....". There is thus insufficient antecedent basis for this limitation in the claims 7 and 8. The meaning of claims 7 and 8 are accordingly considered indefinite and/or 'vague', and the Office has interpreted and rejected the claim as best understood. Applicant is requested to make the appropriated corrections to the claim.

### ***Response to Amendments and Remarks***

2. With respect to Applicant's latest submission, the Office has given consideration to the arguments and remarks filed on January 6, 2009, but are now considered moot in light of the new grounds of rejection provided below.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8, 11 and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carter et al (hereinafter Carter), U.S. Patent Publication US 2003/0035374 A1 in view of Patel et al (hereinafter Patel), U.S. Patent 7,126,913 B1 and in further view of Elwalid et al (hereinafter Elwalid), U.S. Patent 5,978,356.

As per Claim 1, Carter discloses substantial features of the invention, such as an egress rate controller [Carter: Abstract], a leaky bucket having an initial maximum number of tokens which decreases as packets are received in an associated output buffer at a reception token rate for transmission (Carter: e.g., token/leaky bucket shaper) [0084], a plurality of token availability threshold registers (Carter: e.g., buffers 25a-c) [Fig. 4], and a packet suppression controller (Carter: e.g., Router 13) [Fig. 2] suppressing transmission of a packet having a traffic class association of claim 1 (Carter: e.g., decreasing buffer output rate) [Abstract] (e.g. Router with traffic rate control 304) [Fig. 3]. However, Carter does not expressly disclose the additional recited feature of the registers that comprise the egress rate controller "specifying a corresponding plurality of

token amounts defining token availability regions". The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet. A power level for transmission of each packet over the time duration is further determined. Based on the time duration and the power level determined for each packet, a wireless resource impact is determined for each packet. Transmission resources are allocated to each packet based on the wireless resource impact determined for each packet [Abstract]. In particular, Patel discloses the recited features of the registers specifying a corresponding plurality of token amounts defining token availability regions ( $\{X, Y\}$  Token Regions) [Figs. 3, 4 & 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

Further, with regards to the claim, while the combination of Carter and Patel disclose substantial features of the invention as above, neither expressly discloses the additional recited feature of a leaky bucket "wherein a size of the leaky bucket is less than or equal to a size of the associated output buffer" and the controller selectively

suppressing transmission of a packet having a traffic class association "based on a current token availability level being within a token availability region specifying transmission suppression of packets of the traffic class". However, the feature is expressly disclosed by Elwalid in a related endeavor.

Elwalid discloses as his invention a traffic shaping system for increasing the connection-carrying capacity of a network node by shaping the data cells to increase the admissible number of connections. The traffic shaper system uses a data buffer at the ingress of the network node to 'selectively' buffer classes of data cells. As such, the traffic shaping system exploits differences in delay tolerances between traffic classes to shape the less delay sensitive traffic classes to reduce the effective bandwidth of a connection of the particular traffic class to thereby increase the nodal connection-carrying capacity [Abstract]. In particular, Elwalid discloses the additionally recited features of a leaky bucket "wherein a size of the leaky bucket is less than or equal to a size of the associated output buffer" (Elwalid: e.g., Dual Leaky Bucket 16 is characterized by three parameters  $\{r, B_T, P\}$ , wherein ' $B_T$ ' is the leaky bucket '*Token Buffer Size*' [col 5, L16-35] (e.g., 'shaper token buffer size'  $B_{TS}$  and 'data buffer size'  $B_{DS}$ ) [col 6, L5-20] [also, col 11, L29-55] [Fig. 3], and the controller selectively suppressing transmission of a packet having a traffic class association "based on a current token availability level being within a token availability region specifying transmission suppression of packets of the traffic class" (e.g., a node employing a Leaky Bucket Regulator of Buffer Size " $B_{token}$ ") [col 16, L27 – col 17, L26].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Carter and Patel with the above recited feature, as disclosed by Elwalid, for the motivation of providing a method and system of traffic shaping that increases the connection-carrying capacity of a network node by the shaping of data cells (or packets) [Abstract] [col 2, L9-26].

As per Claim 2, Carter discloses the egress rate controller claimed in claim 1, further comprising a classifier classifying received packets in accordance with a plurality of traffic classes (e.g., QoS Class of the packet) [0051] [Figs. 1 & 4].

As per Claim 3, Carter discloses the egress rate controller claimed in claim 1, further comprising a scheduler delaying packet transmission scheduling in accordance with a packet transmission suppression signal provided by the packet transmission suppression controller (Scheduler 305) [Fig. 3].

As per Claims 4 and 11, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited feature of the controller further comprising a bucket size register holding a value representative of a maximum number of tokens allocated to the leaky bucket. The features are expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited feature of the controller further comprising a bucket size register holding a value representative of a maximum number of tokens allocated to the leaky bucket (e.g., Max Bucket Depth of "10") [Figs. 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the recited feature of the controller further comprising a bucket size register holding a value representative of a maximum number of tokens allocated to the leaky bucket, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

Claim 11 recites that same limitations as claim 4, is distinguished only by its statutory category and thus rejected on the same basis.

As per Claim 5, Carter discloses the egress rate controller claimed in claim 4, further comprising an output buffer, the size of the leaky bucket, in tokens, being at most equal to the size of output buffer, employing an output buffer larger than the leaky bucket enabling suppression of packet transmission without discarding packets (e.g., Output Buffer 25) [Fig. 3] [0086] [Fig. 9].



As per Claim 6, Carter discloses the egress rate controller claimed in claim 1, wherein the egress rate controller is associated with an output port of the edge network node (e.g., Port 54) [Fig. 5].

As per Claim 7, Carter discloses an communication network node comprising at least one egress rate controller claimed in claim 1 (egress router 13a/b) [Figs. 2, 4 & 6]

As per Claim 8, Carter discloses an communication network node comprising at least one egress rate controller claimed in claim 1 associated with at least one output port thereof (egress router 13a/b) (Port 54) [Figs. 2, 4 & 6]

As per Claim 17 and 21, Carter discloses the method of effecting egress rate control as claimed in claim 16, wherein selectively suppressing packet transmission, the method further comprises a step of: selectively suppressing packet transmission scheduling (e.g., slow down traffic from buffer) [0073] (scheduler 302) [0078] [0081].

Claim 21 recites the same limitations as claim 17, and thus rejected on the same basis.

As per Claim 18 and 23, Carter discloses the method of effecting egress rate control as claimed in claim 17, further comprising a step of: rescheduling the packet for transmission [0073] [0078].

Claim 23 recites the same limitations as claim 18, and thus rejected on the same basis.

As per Claim 19, Carter discloses the method of effecting egress rate control as claimed in claim 16, further comprising a prior step of: classifying packets in accordance with a plurality of traffic classes (i.e., segregating packet traffic according to CoS) [0078].

As per claim 20, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of the egress controller further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket; and selectively suppressing packet transmission if there are insufficiently many tokens available in the leaky bucket. The features are expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the additional recited feature of the egress controller further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket (e.g., "token available for packet in queue?" 114/134) [Fig. 7] (packet size "L") [col 11, L36]; and selectively suppressing packet

transmission if there are insufficiently many tokens available in the leaky bucket [col 8, L60 –col 9, L4] [Fig. 7] [col 9, L44-60] [col 10, L32-40] [Figs. 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited feature, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

As per Claim 22, Carter discloses the method of effecting egress rate control as claimed in claim 21, further comprising a step of: storing the packet in an output buffer (e.g., Output buffer 25) [Fig. 3].

2. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carter et al (hereinafter Carter), U.S. Patent Publication US 2003/0035374 A1 in view of Patel et al (hereinafter Patel), U.S. Patent 7,126,913 B1, and in further view of Lee et al (hereinafter Lee), U.S. Patent, 7,349,403 B2.

As per Claim 16, while the combination of Carter, Patel, and Elwalid discloses substantial features of the invention, such as the egress rate controller, the plurality of token availability threshold level registers, the registers specifying a corresponding plurality of token amounts defining token availability regions and the controller

selectively suppressing transmission of a packet having a traffic class association based on a current token availability level being within a token availability region specifying transmission suppression of packets of the traffic class, as in claim 1, the additional recited feature of the method further comprising token availability thresholds, "wherein the token availability threshold levels corresponds to predetermined egress rate control responses to bandwidth utilization with respect to packet traffic classes" is expressly disclosed by Lee in a related endeavor.

Lee discloses as his invention a differentiated services device. The differentiated services device includes: a traffic metering unit to indicate whether an information element in a flow conforms to a peak rate and a committed rate; a storage congestion metering unit to determine whether the information element should be accepted or discarded; and a marking unit to mark the information element with one of a plurality of mark values, wherein the marking unit is coupled to the traffic metering unit and the storage congestion unit [Abstract] [col 4, L25-34]. In particular, Lee discloses the additionally recited feature the method "wherein the token availability threshold levels corresponds to predetermined egress rate control responses to bandwidth utilization with respect to packet traffic classes" (e.g., determining whether 'average usage of a class to which a flow belongs' is equal to, less than, or greater than a minimum / maximum threshold) [Figs. 1-2] [col 5, L31-45] (e.g., *Egress Port Link List*) [Fig. 20] (e.g., Conformance / Non-Conformance Received Packet with respect to Current Token Bucket "TB") [Figs. 31-33] (e.g., 'Accept' or 'Discard' Packet with respect to Minimum / Maximum Threshold Levels and Drop Probability) [Figs. 34-41] (e.g. *Ingress or Egress*

'Packet Mode') [col 32, L47-54] (e.g., token availability threshold 'conformance / non-conformance') ( e.g., CDROP /PDRAP) [col 57, L64 –col 58, L31] [Figs. 36 & 37].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Carter, Patel and Elwalid with the above recited feature, as disclosed by Lee, for the motivation of providing a differentiated services device that overcomes the problems associated with "best effort service" processing of network traffic, and provides deterministic behavior in processing real time network traffic [col 4, L7-21].

3. Claims 9-10, 12-15 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carter et al (hereinafter Carter), U.S. Patent Publication US 2003/0035374 A1 in view of Patel et al (hereinafter Patel), U.S. Patent 7,126,913 B1, and in further view of Gracon et al (hereinafter Gracon), U.S. Patent, 6,987,732 B2 and Lee et al (hereinafter Lee), U.S. Patent, 7,349,403 B2.

As per Claim 9, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of an "ingress" rate controller, the controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability regions. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited features of an "ingress" rate controller (ingress control system 34), the controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability regions ( $\{X, Y\}$  Token Regions) [Figs. 3, 4 & 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

Additionally, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, the additionally recited features of each packet discard probability register specifying a probability with which packets of a specific traffic class are to be dropped when a current token availability level is within a token availability region, and a packet acceptance controller selectively randomly discarding packets having a traffic class association based on the current token availability level being within a token availability region specifying random packet

discard of packets of the traffic class, are expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited features of a packet discard probability register specifying a probability with which packets of a specific traffic class are to be dropped when a current token availability level is within a token availability region ("Drop Probability"  $P_b$ ) [col 7, L45], and a packet acceptance controller selectively randomly discarding packets having a traffic class association based on the current token availability level being within a token availability region specifying random packet discard of packets of the traffic class ("...the packet is randomly dropped based on the calculated  $P_b$ ") [col 7, L49-53]. Gracon also expressly discloses both egress and ingress traffic grooming / shape control of packets that is 'configurable' [col 2, L58 – col3, L26].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the invention resulting from the combination of Carter and Patel with the above recited features, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

Further, with regards to the claim, while the combination of Carter, Patel and Gracon discloses substantial features of the invention as above, the additionally recited feature of an ingress rate controller further comprising a plurality of discard probability registers specifying a probability with which packets are to be dropped is expressly disclosed by Lee in a related endeavor.

Lee discloses as his invention a differentiated services device. The differentiated services device includes: a traffic metering unit to indicate whether an information element in a flow conforms to a peak rate and a committed rate; a storage congestion metering unit to determine whether the information element should be accepted or discarded; and a marking unit to mark the information element with one of a plurality of mark values, wherein the marking unit is coupled to the traffic metering unit and the storage congestion unit [Abstract] [col 4, L25-34]. In particular, Lee discloses the additionally recited feature of an ingress rate controller further comprising a plurality of discard probability registers specifying a probability with which packets are to be dropped (e.g., Registers 211 with 'Drop Probability') [Fig. 2] (e.g., Instruction and State Registers 226a-c) [Fig. 4] [col 9, L16-55] [Fig. 5] [col 10, L16-60] [Fig. 37] [col 56, L22-55] [Tables 1 & 2].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Carter, Patel and Gracon with the above recited feature, as disclosed by Lee, for the motivation of providing a differentiated services device that overcomes the problems associated with "best effort service" processing of network



traffic, and provides deterministic behavior in processing real time network traffic [col 4, L7-21].

As per Claim 10, while Carter discloses substantial features of the invention, such as the egress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of an "ingress" rate controller, the controller further comprising a classifier classifying received packets in accordance with a plurality of traffic classes. The features are expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the additional recited feature of an "ingress" rate controller (ingress control system 34) further comprising a classifier classifying received packets in accordance with a plurality of traffic classes [col 1, L36-41].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited feature, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

As per Claim 12, Carter discloses the ingress rate controller claimed in claim 9, further comprising an input buffer, the size of the leaky bucket, in tokens, being at most equal to the size of input buffer, employing an input buffer larger than the leaky bucket providing a slack in the number of packets available for transmission to mask the effects of the ingress rate control effected (Input Buffers 41a-c) [Fig 4].

As per Claim 13, Carter discloses the ingress rate controller claimed in claim 9, wherein the ingress rate controller is associated with an input port of the edge network node (Port 54) [Fig. 5].

As per Claim 14, Carter discloses a communication network node comprising at least one ingress rate controller claimed in claim 9 (Ingress router 130) [Fig. 6].

As per Claim 15, Carter discloses an communication network node comprising at least one ingress rate controller (Ingress router 130) [Fig. 6] claimed in claim 9 associated with at least one input port thereof (Port 54) [Fig. 5].

As per Claim 24, while Carter discloses substantial features of the invention, such as the ingress rate controller and the plurality of token registers of claim 1, he does not expressly disclose the recited features of the 'ingress rate controller' further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability levels. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited features of an "ingress" rate controller (ingress control system 34), the controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability levels or regions ({X, Y} Token Regions) [Figs. 3, 4 & 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

However, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, the additionally recited feature of the controller comprising the step of selectively randomly discarding packets of a particular traffic class when a current token availability level of a leaky bucket tracking packets is between two token availability threshold levels of a plurality of token availability threshold levels is more expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited features of the controller selectively randomly discarding packets having a traffic class association based on the current token availability level being within a token availability region specifying random packet discard of packets of the traffic class (MinTh / MaxTh Packet Discard Parameters) (...the packet is randomly dropped based on the calculated Pb") [col 7, L28 – col 8, L12]. Gracon also expressly discloses both egress and ingress traffic grooming / shape control of packets that is 'configurable' [col 2, L58 – col3, L26].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify Carter's invention with the above recited feature, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

Further, with regards to the claim, while the combination of Carter, Patel and Gracon discloses substantial features of the invention as above, the additionally recited feature of the method further comprising token availability thresholds, wherein the token availability levels correspond to predetermined ingress rate control responses to bandwidth utilization with respect to packet traffic classes is expressly disclosed by Lee in a related endeavor.

Lee discloses as his invention a differentiated services device. The differentiated services device includes: a traffic metering unit to indicate whether an information element in a flow conforms to a peak rate and a committed rate; a storage congestion metering unit to determine whether the information element should be accepted or discarded; and a marking unit to mark the information element with one of a plurality of mark values, wherein the marking unit is coupled to the traffic metering unit and the storage congestion unit [Abstract] [col 4, L25-34]. In particular, Lee discloses the additionally recited feature the method wherein the token availability levels correspond to predetermined ingress rate control responses to bandwidth utilization with respect to packet traffic classes (e.g., determining whether 'average usage of a class to which a flow belongs' is equal to, less than, or greater than a minimum / maximum threshold) [Figs. 1-2] [col 5, L31-45] (e.g., *Ingress 'growth / line rate'*) [col 2, L24-26] (e.g., *Ingress*) [col 32, L10-37] (e.g., Conformance / Non-Conformance of received Packet with respect to Current Token Bucket "TB") [Figs. 31-33] (e.g. 'Accept' or 'Discard' Packet with respect to Minimum / Maximum Threshold Levels and Drop Probability) [Figs. 34-41] (e.g. *Ingress or Egress 'Packet Mode'*) [col 32, L47-54].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Carter, Patel and Gracon with the above recited feature, as disclosed by Lee, for the motivation of providing a differentiated services device that overcomes the problems associated with "best effort service" processing of network traffic, and provides deterministic behavior in processing real time network traffic [col 4, L7-21].

As per Claim 25, while Carter discloses substantial features of the invention, such as the ingress rate controller and the plurality of token registers of claim 1, he does not expressly disclose the recited features of the "ingress" rate controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability regions. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the recited features of an "ingress" rate controller (ingress control system 34), the controller further comprising threshold registers specifying a corresponding plurality of token amounts defining token availability regions ( $\{X, Y\}$  Token Regions) [Figs. 3, 4 & 8a-e].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

However, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, neither expressly discloses the

recited feature of the controller further comprising a step of randomly discarding packets with a corresponding discard probability. The feature is expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited feature of the controller further comprising a step of randomly discarding packets with a corresponding discard probability ("Drop Probability" Pb) [col 7, L45] ("...the packet is randomly dropped based on the calculated Pb") [col 7, L49-53].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the invention resulting from the combination of Carter and Patel with the above recited features, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

As per Claim 26, Carter discloses the method of effecting ingress rate control as claimed in claim 24, further comprising a prior step of: classifying packets in accordance with a plurality of traffic classes (e.g., QoS Class of the packet) [0051] [Figs. 1 & 4].

As per Claim 27, while Carter discloses substantial features of the invention, such as the ingress rate controller and the plurality of token availability threshold level registers of claim 1, he does not expressly disclose the recited features of the method further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket. The feature is expressly disclosed by Patel in a related endeavor.

Patel discloses as his invention a method and system for managing transmission resources in a wireless communications network including receiving a plurality of packets and determining a time duration for transmission of each packet [Abstract]. In particular, Patel discloses the additional recited feature of the egress controller further comprising a step of determining whether a plurality of tokens corresponding to a size of the packet are available in the leaky bucket (e.g., "token available for packet in queue?" 114/134) [Fig. 7]. Patel additionally teaches that packets are only transmitted when sufficient tokens 52 are available in the token bucket 50 for the power level and duration of a transmission token 70 representing the packet [col 10, L31-41] [Figs. 8a-e]. Patel also teaches that if available resources do not exist to transmit a first packet in the queue 40, later queued packets for which sufficient resources are available will be transmitted to maximize use of available resources [col 9, L1-4].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to combine and/or modify Carter's invention with the above recited features, as disclosed by Patel, for the motivation of providing a method and system for



managing transmission resources in a wireless communications network architecture [col 1, L30-34] [Fig. 1].

However, while the combination of Carter and Patel discloses substantial features of the invention such as the egress and ingress controllers of claim 1 and 9, respectively, as well as the threshold/discard registers, neither expressly discloses the additionally recited features of selectively discarding the packet if there are insufficiently many tokens available in the leaky bucket. The features are expressly disclosed by Gracon in a related endeavor.

Gracon discloses as his invention a packet scheduler including a packet manager interface, a policer, a congestion manager, a scheduler, and a virtual output queue (VOQ) handler [Abstract]. In particular, Gracon discloses the recited feature of selectively discarding the packet if there are insufficiently many tokens available in the leaky bucket (e.g. randomly dropping a packet based on drop probability  $P_b$ ) [col 7, L28-53].

It would thus be obvious to one of ordinary skill in the art at the time of the invention to modify the invention resulting from the combination of Carter and Patel with the above recited feature, as disclosed by Gracon, for the motivation of providing an apparatus that is programmable to accommodate existing protocols and to anticipate any future protocols, as well as to efficiently schedule packets in a broadband data stream [col 2, L11-23].

### ***Conclusion***

1. The Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.
2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenford Madamba whose telephone number is 571-272-7989. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on 571-272-3964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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